WHAT IS CLAIMED IS:

1. A virus-like particle comprising at least one protein selected from the group consisting of:

(a) a protein having an amino acid sequence as set forth in SEQ ID NO:1;

(b) a protein having an amino acid sequence as set forth in SEQ ID NO:3; and

(c) a mutein of said protein of (a) or (b).

2. The virus-like particle of claim 1, wherein said protein is recombinant.

3. The virus-like particle of claim 1, wherein said mutein has an amino acid sequence as set forth in SEQ ID NO:1 or as set forth in SEQ ID NO:3, wherein at least one amino acid residue, preferably three amino acid residues, more preferably two amino acid residues, and even more preferably one amino acid residue is added, deleted or substituted, wherein preferably said at least one substitution is a conservative substitution.

4. The virus-like particle of claim 1, wherein said mutein has an amino acid sequence as set forth in SEQ ID NO:1 or as set forth in SEQ ID NO:3, wherein at least one cysteine residue, preferably two cysteine residues, is deleted or substituted, wherein preferably said at least one substitution is a conservative substitution.

5. The virus-like particle of claim 1, wherein said mutein has an amino acid sequence as set forth in SEQ ID NO:1 or as set forth in SEQ ID NO:3, wherein at least one lysine residue, preferably three lysine residues, more preferably two lysine residues, and even more preferably one lysine is added, deleted or

substituted, wherein preferably said at least one substitution is a conservative substitution.

6. A mutein having an amino acid sequence as set forth in SEQ ID NO:3

7. A mutein of the recombinant protein of SEQ ID NO: 1 or SEQ ID NO:3.

8. A mutein of claim 7, wherein at least one amino acid residue, preferably three amino acid residues, more preferably two amino acid residues, and even more preferably one amino acid residue is added, deleted or substituted, wherein preferably said at least one substitution is a conservative substitution.

9. A mutein of claim 7, wherein at least one cysteine residue, preferably two cysteine residues, is deleted or substituted, wherein preferably said at least one substitution is a conservative substitution.

10. A mutein of claim 7, wherein at least one lysine residue, preferably three lysine residues, more preferably two lysine residues, and even more preferably one lysine is added, deleted or substituted, wherein preferably said at least one substitution is a conservative substitution.

11. A vector for producing a AP205 virus like particle comprising a nucleotide sequence being at least 80%, preferably at least 90%, more preferably at least 95%, and even more preferably 99% identical to that of SEQ ID NO:2 or SEQ ID NO: 4.

12. A vector for the production of a recombinant protein comprising a nucleotide sequence encoding a polypeptide fused to a protein, wherein said protein is selected from the group consisting of:

(a) a protein having an amino acid sequence as set forth in SEQ ID NO:1;

(b) a protein having an amino acid sequence as set forth in SEQ ID NO:3; and

(c) a mutein of said polypetide of (a) or (b).

13. A composition comprising:

(a) a core particle selected from the group consisting of

(i) an AP205 virus particle; and

(ii) AP205 virus-like particles; and

(b) an organic molecule

wherein the organic molecule is bound to the core particle.

14. The composition of claim 13, wherein said organic molecule and core particle forms an ordered and repetitive array of the organic molecule on the surface of the core particle.

15. The composition of claim 13, wherein the organic molecule is bound to the core particle via a third molecule, said third molecule linking the core particle to the organic molecule.

16. The composition of claim 13, wherein said organic molecule is bound to the core particle by at least one covalent bond, wherein preferably said covalent bond comprises a peptide bond.

17. The composition of claim 13, wherein said organic molecule is bound to the core particle by at least one covalent bond, wherein preferably said covalent bond comprises a non-peptide bond.

18. The composition of claim 13, wherein the organic molecule comprises, or preferably is, a hapten, an antigen or an antigenic determinant, and wherein more preferably said organic molecule is an antigen or an antigenic determinant.

19. The composition of claim 13 or 18, wherein the virus like particle contains at least a first attachment site, and the organic molecule contains at least a second attachment site, such that said second attachment site is capable of association with said first attachment site to form an ordered and repetitive antigen array, preferably via at least one non-peptide bond.

20. The composition of claim 19, wherein said first attachment site comprises, preferably is, an amino group, and wherein preferably said first attachment site comprises, preferably is, a lysine residue, and wherein said second attachment site comprises, preferably is, a sulfhydryl group, and wherein preferably said second attachment site comprises, preferably is, a cysteine residue.

21. The composition of claim 19, wherein said second attachment site does not naturally occur within said organic molecule.

22. The composition of claim 19, wherein said composition comprises an amino acid linker, and wherein preferably said amino acid linker is bound to said antigen or said antigenic determinant by way of at least one covalent bond, preferably by way of at least one peptide bond.

23. The composition of 19, wherein said amino acid linker comprises said second attachment site.

24. The composition of claim 22, wherein said amino acid linker is selected from the group consisting of:

(a) CGG;

(b) N-terminal gamma 1-linker;

(c) N-terminal gamma 3-linker;

(d) Ig hinge regions;

(e) N-terminal glycine linkers;

(f) $(G)_kC(G)_n$ with n=0-12 and k=0-5 (SEQ ID NO: 93);

(g) N-terminal glycine-serine linkers;

(h) $(G)_kC(G)_m(S)_l(GGGGS)_n$ with n=0-3, k=0-5, m=0-10, l=0-2 (SEQ ID NO: 94);

(i) GGC;

(k) GGC-NH2;

(l) C-terminal gamma 1-linker;

(m) C-terminal gamma 3-linker;

(n) C-terminal glycine linkers;

(o) $(G)_nC(G)_k$ with n=0-12 and k=0-5 (SEQ ID NO: 95);

(p) C-terminal glycine-serine linkers; and

(q) $(G)_m(S)_l(GGGGS)_n(G)_oC(G)_k$ with n=0-3, k=0-5, m=0-10, l=0-2, and o=0-8 (SEQ ID NO: 96).

25. The composition of claim 13, wherein said organic molecule is selected from the group consisting of:

(a) an organic molecule suited to induce an immune response against cancer cells;

(b) an organic molecule suited to induce an immune response against infectious diseases;

(c) an organic molecule suited to induce an immune response against allergens;

(d) an organic molecule suited to induce an improved response against self-antigens;

(e) an organic molecule suited to induce an immune response in farm animals or pets;

(f) an organic molecule suited to induce a response against a drug, a hormone or a toxic compound; and

(g) fragments, muteins or domains of the molecules set out in (a)-(f).

26. The composition of claim 13, wherein the organic molecule is an antigen or an antigenic determinant, or a fragment or mutein thereof, being selected from the group consisting of

(a) an antigen or an antigenic determinant suited to induce an immune response against cancer cells;

(b) an antigen or an antigenic determinant suited to induce an immune response against infectious diseases;

(c) an antigen or an antigenic determinant suited to induce an immune response against allergens;

(d) an antigen or an antigenic determinant suited to induce an improved response against self-antigens;

(e) an antigen or an antigenic determinant suited to induce an immune response in farm animals or pets;

(f) an antigen or an antigenic determinant suited to induce a response against a drug, a hormone or a toxic compound; and

(h) fragments or domains of the molecules set out in (a)-(f).

27. The composition of claim 13, wherein said organic molecule is an antigen selected from the group of :

(a) a polypeptide of HIV,

(b) a polypeptide of Influenza virus,

(c) a polypeptide of Hepatitis C virus,

(d) a polypeptide of *Toxoplasma*,

(e) a polypeptide of *Plasmodium falciparum*,

(f) a polypeptide of *Plasmodium vivax*,

(g) a polypeptide of *Plasmodium ovale*,

(h) a polypeptide of *Plasmodium malariae*,

(i) a polypeptide of breast cancer cells,

(j) a polypeptide of kidney cancer cells,

(k) a polypeptide of prostate cancer cells,

(l) a polypeptide of skin cancer cells,

(m) a polypeptide of brain cancer cells,

(n) a polypeptide of leukemia cells,

(o) a recombinant profiling,

(p) a polypeptide of bee sting allergy,

(q) a polypeptide of nut allergy,

(r) a polypeptide of food allergies,

(s) a polypeptide of asthma, or

(t) a polypeptide of *Chlamydia*

(u) Her2,

(v) GD2,

(w) EGF-R,

(x) CEA,

(y) CD52,

(z) Human melanoma gp100,

(aa) Human melanoma melanA/MART-1,

(bb) Tyrosinase,

(cc) NA17-A nt,

(dd) MAGE3,

(ee) P53, and

(ff) HPV16E7; and

(gg) any fragment or mutein of said antigen of (a) to (z) and of (aa) to (ff).

28. The composition of claim 18, wherein said antigen or antigenic determinant is a peptide, a protein, or a fragment or mutein of a protein or peptide, selected from the group consisting of:

(a) a phospholipase A_2 protein;

(b) a human IgE;

(c) a lymphotoxin;

(d) an Influenza M2 protein; and

(e) a Der p I peptide.

29. The composition of claim 13, wherein said organic molecule is an antigen or antigenic determinant, further that said antigen or said antigenic determinant is a self antigen or an anti-idiotypic antibody, or fragments of either thereof.

30. The composition of claim 29, wherein said self antigen is a protein, a peptide or any fragments or muteins thereof, selected from the group consisting of:

(a) a lymphotoxin;

(b) a lymphotoxin receptor;

(c) RANKL;

(d) VEGF;

(e) VEGFR;

(f) Interleukin-5;

(g) Interleukin-8

(h) Interleukin-17;

(i) Interleukin-13;

(j) Angiotensin;

(k) CCL21;

(l) CXCL12;

(m) SDF-1;

(n) MCP-1;

(o) Endoglin;

(p) Resistin;

(q) GHRH;

(r) LHRH;

(s) TRH;

(t) MIF;

(u) Eotaxin;

(v) Bradykinin;

(v) BLC;

(w) M-CSF;

(x) Tumor Necrosis Factor α (TNFα);

(y) amyloid beta peptide ($A\beta_{1-42}$); and

(z) a human IgE.

31. The composition of claim 29, wherein said self antigen is a lymphotoxin or a fragment thereof selected from the group consisiting of:

(a) lymphotoxin α (LTα);

(b) lymphotoxin β (LTβ); and

(c) a mixture or combination of LTα and LTβ.

32. The composition of claim 13, wherein said organic molecule is an organic molecule suited to induce an immune response against a drug, hormone or toxin.

33. The composition of claim 32, wherein said organic molecule is an organic molecule suited to induce an immune response against a drug.

34. The composition of claim 33, wherein said drug is selected from the group consisting of:

(a) codeine;

(b) fentanyl;

(c) heroin;

(d) morphine;

(e) amphetamine;

(f) cocaine;

(g) methylenedioxymethamphetamine;

(h) methamphetamine;

(i) methylphenidate;

(j) nicotine;

(k) LSD;

(l) mescaline;

(m) psilocybin; and

(n) tetrahydrocannabinol.

35. The composition of claim 34, wherein said drug is nicotine.

36. The composition of claim 13, wherein the organic molecule is suited to induce an immune response against a hormone.

37. The composition of claim 36, wherein the hormone is selected from the group comprising:

(a) Progesterone;

(b) Estrogen;

(c) Testosterone;

(d) follicle stimulating hormone;

(e) melanin stimulating hormone;

(f) adrenalin; and

(g) noradrenalin.

38. The composition of claim 13, wherein the organic molecule is suited to induce an immune response against a toxin.

39. The composition of claim 38, wherein the toxin is selected from the group consisting of:

(a) Aflatoxin;

(b) ciguetera toxin;

(c) tetrodotoxin;

(d) antibiotics; and

(e) anticancer agents.

40. A pharmaceutical composition comprising:

(a) the composition of claim13 and

(b) an acceptable pharmaceutical carrier.

41. A vaccine composition comprising an immunologically effective amount of the composition of claim 13.

42. A method of immunization comprising administering the vaccine composition of claim 41.

43. The vaccine composition of claim 41 further comprising an adjuvant.

44. A process for producing a non-naturally occurring, ordered and repetitive antigen array comprising:

(a) providing a molecular scaffold comprising a core particle selected from the group of

(i) AP205 virus; and

(ii) AP205 virus-like particles; and

(b) providing an organic molecule suitable for inducing an immune response;

(c) providing a means of associating (a) and (b), said means optionally contained within (a) and/or (b), or as a separate molecule; amd

(d) combining the elements of (a) through (c), such that said organic molecule associates with said scaffold to form an ordered and repetitive antigen array.

45. A method of treating or preventing a disease, disorder or physiologic conditions in an individual, said method comprising adminstering to an individual the composition of claim 13.

46. A method of treating or preventing a disease, disorder or physiologic conditions in an individual, said method comprising adminstering to an individual the vaccine composition of claim 41.

47. A nucleic acid molecule comprising a nucleotide sequence as set forth in SEQ ID NO:125.

48. A host cell containing a nucleic acid according to claim 47 or a vector according to claim 11.

49. The host cell of claim 48, wherein said host cell is *E.coli*.

50. A method of producing a virus-like particle according to claim 1 comprising the steps of

(a) providing a nucleic acid according to claim 47 or a vector according to claim 11;

(b) introducing said nucleic acid or said vector into a host cell;

(c) expressing said nucleic acid or the sequence of said vector in said host cell to obtain a protein or a mutein capable of forming a virus-like particle according to claim 1.

51. The method of claim 50, wherein said host cell is *E.coli*.